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of their environment. In short, it is a study of the ecological anatomy of fossil leaves. The leaves of *Calamites* are mostly known as impressions, and THOMAS has referred the structures he has been able to obtain to the better known impression forms. The petrified material used was obtained from the Lower Coal-measures (Halifax Hard Bed), and five types of leaf were distinguished. The twigs bearing the leaves proved to be quite interesting in stelar structure, especially in its relation to that of young stems of *Equisetum.*

The ecological conclusion is as follows: "The leafy twigs seem to have grown in a pendulous fashion, and the structure of the mesophyll and epidermis suggests that the habitat was a damp one. On the other hand, the leaves possess some xeromorphic features, such as the presence of fibers in the longer forms. The evidence points to a marsh or swamp forest as their habitat; this may have been near the sea, but if so the soil probably contained little salt."—J. M. C.

Transpiration in salt marsh plants.—Transpiration rates of cut shoots of *Salicornia annua* and *Suaeda maritima* have been found by DELF[43] to be equal to or greater than those from equal surface areas of such mesophtyes as *Vicia Faba.* The highest degree of succulence seemed to be accompanied by the highest transpiration rate per unit area. Relating transpiration to evaporation from a water surface, unit areas of *Salicornia* lost 32 per cent and of *Vicia* 26 per cent as much water as equal areas of water surface. It was shown that *Salicornia* is able to absorb water readily through the surface of its stems when submerged, and less convincingly that it does not absorb sufficiently through its root system to replace the loss by transpiration except in a humid atmosphere. This seems the more surprising, since TRANSEAU[44] has shown evaporation to be exceptionally high in salt marshes. The stomata in *Salicornia* and *Aster trifolium* appear to have distinct powers of movement in young plants early in the season, losing this plasticity at a later date.—GEO. D. FULLER.

Cytology of the ascus.—An account of the cytology of *Helvella crispa* Fries is given by Miss CARRUTHERS.[45] The cells of the hypothecium are one to several-nucleate, and some of the nuclei were observed to fuse in pairs, but no migration was observed like that in *Humaria.* An attempt was made to determine the number of chromosomes on the spindles in the vegetative hyphae. Apparently two chromosomes are present in the vegetative spindles, and four or eight on the spindles in the fertile hyphae, but owing to the minuteness of the objects not much importance can be attached to these observations. The divisions in the ascus follow the same routine as described by Miss FRASER in *Humaria rutilans*. The first mitosis is heterotypic, the second homotypic, and the third brachymeiotic, leading to a reduction without division in the last mitosis. The spores are formed by the astral rays in the manner described by HARPER for *Pyronema*.—H. HASSELBRING.

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[43] DELF, E. MARION, Transpiration and behavior of stomata in halophytes. Ann. Botany **25**:484–505. 1911.

[44] BOT. GAZ. **45**:217–231. 1908.

[45] CARRUTHERS, D., Contributions to the cytology of *Helvella crispa* Fries. Ann. Botany **25**:243–252. *pls. 2.* 1911.

A parasitic orchid.—According to the investigation of KUSANO,[46] the vegetative body of the orchid *Castrodia elata* consists of a tuberous rhizome which multiplies through the production of tuberous offshoots. If these offshoots form no mycorhiza, they decrease in size and finally die without being able to flower, but if infected by the mycelium of *Armillaria mellea* they enlarge, flower, and produce daughter tubercles; it is therefore concluded that the orchid is completely parasitic upon the fungus. The mycorhiza is of the ectotropic type; occasionally, however, the fungus behaves as a parasite, penetrating deeply into the tissue of the tubers and causing their collapse in a manner similar to that seen in potato tubers attacked by the same organism.—GEO. D. FULLER.

Budding in Cycas.—While in Japan, Miss STOPES[47] noted the origin of the well known adventitious buds of *Cycas revoluta*. They arise on the upper portions of old leaf bases, some appearing more than 200 crowns back of the growing point. None were found arising from the axis, and the young buds do not seem to have any connection with the axis. The buds when removed grow into normal plants, but when they develop strongly upon the parent plant they give rise to the so-called "branching," and in such cases, of course, vascular connections are established with the main axis.—CHARLES J. CHAMBERLAIN.

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[46] KUSANO, S., Preliminary note on *Gastrodia elata* and its mycorhiza. Ann. Botany **25**:521–523. 1911.

[47] STOPES, MARIE C., Adventitious budding and branching in *Cycas revoluta*. New Phytol. **9**:234–241. *figs. 7.* 1910.